#9

SEQUENCE LISTING

<110> Peak, Ian
Jennings, Michael

<120> MODIFIED SURFACE ANTIGEN

<130> 8795-24U1

<140> US 09/771,382
<141> 2001-01-25

<150> US 60/177,917
<151> 2000-01-25

<160> 52

<170> PatentIn version 3.0

<210> 1
<211> 591
<212> PRT
<213> Neisseria meningitidis

<400> 1

A2

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Ala Asn Asn Glu Glu Gln Glu Glu Asp Leu Tyr Leu Asp Pro
50 55 60

Val Gln Arg Thr Val Ala Val Leu Ile Val Asn Ser Asp Lys Glu Gly
65 70 75 80

Thr Gly Glu Lys Glu Lys Val Glu Glu Asn Ser Asp Trp Ala Val Tyr
85 90 95

Phe Asn Glu Lys Gly Val Leu Thr Ala Arg Glu Ile Thr Leu Lys Ala
100 105 110

Gly Asp Asn Leu Lys Ile Lys Gln Asn Gly Thr Asn Phe Thr Tyr Ser
115 120 125

Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Gly Thr Glu Lys Leu
130 135 140

Ser Phe Ser Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp Thr Lys
145 150 155 160

Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr

165 170 175

Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Leu Asn
180 185 190

Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu
195 200 205

Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn
210 215 220

Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe
225 230 235 240

Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr
245 250 255

Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val
260 265 270

Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu
275 280 285

Val Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly
290 295 300

Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala
305 310 315 320

Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala
325 330 335

Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser
340 345 350

Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile
355 360 365

Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln
370 375 380

Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser
385 390 395 400

Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met
405 410 415

Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg
420 425 430

Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser
435 440 445

Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp
450 455 460

Gly Asp Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val Arg

465 470 475 480

Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val
485 490 495

Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn
500 505 510

Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala
515 520 525

Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly
530 535 540

Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser
545 550 555 560

Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn
565 570 575

Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
580 585 590

<210> 2
<211> 592
<212> PRT
<213> Neisseria meningitidis

<400> 2

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Ala Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Asn Ala Thr Asp Glu Asp Glu Glu Glu Glu Leu Glu Ser Val Gln
50 55 60

Arg Ser Val Val Gly Ser Ile Gln Ala Ser Met Glu Gly Ser Val Glu
65 70 75 80

Leu Glu Thr Ile Ser Leu Ser Met Thr Asn Asp Ser Lys Glu Phe Val
85 90 95

Asp Pro Tyr Ile Val Val Thr Leu Lys Ala Gly Asp Asn Leu Lys Ile
100 105 110

Lys Gln Asn Thr Asn Glu Asn Thr Asn Ala Ser Ser Phe Thr Tyr Ser
115 120 125

Leu Lys Lys Asp Leu Thr Gly Leu Ile Asn Val Glu Thr Glu Lys Leu
130 135 140

```
Ser Phe Gly Ala Asn Gly Lys Lys Val Asn Ile Ile Ser Asp Thr Lys
145                 150                 155                 160

Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr
                165                 170                 175

Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Met Leu Leu Asn
            180                 185                 190

Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu
        195                 200                 205

Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn
    210                 215                 220

Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe
225                 230                 235                 240

Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr
                245                 250                 255

Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val
            260                 265                 270

Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu
        275                 280                 285

Val Thr Gly Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly
    290                 295                 300

Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala
305                 310                 315                 320

Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala
                325                 330                 335

Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Lys Val Thr Phe Ala Ser
            340                 345                 350

Gly Asn Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile
        355                 360                 365

Thr Val Lys Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln
    370                 375                 380

Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser
385                 390                 395                 400

Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met
                405                 410                 415

Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg
            420                 425                 430

Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser
        435                 440                 445
```

A2

Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp
450 455 460

Asp Glu Gly Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro Val
465 470 475 480

Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn
485 490 495

Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp
500 505 510

Asn Val Asn Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr
515 520 525

Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile
530 535 540

Gly Gly Gly Thr Tyr Leu Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser
545 550 555 560

Ser Ile Ser Ala Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly
565 570 575

Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
580 585 590

<210> 3
<211> 589
<212> PRT
<213> Neisseria meningitidis

<400> 3

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Ala Thr Ala Val Leu Ala Thr Leu Leu Ser Ala Thr Val Gln
35 40 45

Ala Asn Ala Thr Asp Thr Asp Glu Asp Glu Glu Leu Glu Ser Val Ala
50 55 60

Arg Ser Ala Leu Val Leu Gln Phe Met Ile Asp Lys Glu Gly Asn Gly
65 70 75 80

Glu Ile Glu Ser Thr Gly Asp Ile Gly Trp Ser Ile Tyr Tyr Asp Asp
85 90 95

His Asn Thr Leu His Gly Ala Thr Val Thr Leu Lys Ala Gly Asp Asn
100 105 110

Leu Lys Ile Lys Gln Ser Gly Lys Asp Phe Thr Tyr Ser Leu Lys Lys
115 120 125

Glu Leu Lys Asp Leu Thr Ser Val Glu Thr Glu Lys Leu Ser Phe Gly
130 135 140

Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp Thr Lys Gly Leu Asn
145 150 155 160

Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Pro Thr Val His Leu
165 170 175

Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Ala Gly Ser Ser Ala
180 185 190

Ser His Val Asp Ala Gly Asn Gln Ser Thr His Tyr Thr Arg Ala Ala
195 200 205

Ser Ile Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys Gly Val Lys
210 215 220

Thr Gly Ser Thr Thr Gly Gln Ser Glu Asn Val Asp Phe Val Arg Thr
225 230 235 240

Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr Val
245 250 255

A2 Asn Val Glu Ser Lys Asp Asn Gly Lys Arg Thr Glu Val Lys Ile Gly
260 265 270

Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr Gly
275 280 285

Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu
290 295 300

Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp Arg
305 310 315 320

Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe
325 330 335

Glu Thr Val Thr Ser Gly Thr Lys Val Thr Phe Ala Ser Gly Asn Gly
340 345 350

Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val Lys
355 360 365

Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln Asn
370 375 380

Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly Lys
385 390 395 400

Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu Thr
405 410 415

Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys
420 425 430

Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser Val Ser
435 440 445

Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Asp Glu Gly
450 455 460

Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro Val Arg Ile Thr
465 470 475 480

Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala Gln
485 490 495

Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val Asn
500 505 510

Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu
515 520 525

Ala Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly Gly
530 535 540

Thr Tyr Leu Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser
545 550 555 560

Asp Thr Gly Asn Trp Val Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg
565 570 575

Gly His Phe Gly Thr Ser Ala Ser Val Gly Tyr Gln Trp
580 585

<210> 4
<211> 594
<212> PRT
<213> Neisseria meningitidis

<400> 4

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Ala Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Ala Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Thr Thr Asp Asp Asp Asp Leu Tyr Leu Glu Pro Val Gln Arg
50 55 60

Thr Ala Val Val Leu Ser Phe Arg Ser Asp Lys Glu Gly Thr Gly Glu
65 70 75 80

Lys Glu Val Thr Glu Asp Ser Asn Trp Gly Val Tyr Phe Asp Lys Lys
85 90 95

Gly Val Leu Thr Ala Gly Thr Ile Thr Leu Lys Ala Gly Asp Asn Leu

100 105 110

Lys Ile Lys Gln Asn Thr Asn Glu Asn Thr Asn Ala Ser Ser Phe Thr
115 120 125

Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Gly Thr Glu
130 135 140

Lys Leu Ser Phe Ser Ala Asn Ser Asn Lys Val Asn Ile Thr Ser Asp
145 150 155 160

Thr Lys Gly Leu Asn Phe Ala Lys Lys Thr Ala Glu Thr Asn Gly Asp
165 170 175

Thr Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu
180 185 190

Leu Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp
195 200 205

Asp Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly
210 215 220

Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val
225 230 235 240

Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr
245 250 255

Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Arg Thr
260 265 270

Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly
275 280 285

Lys Leu Val Thr Gly Lys Asp Lys Gly Glu Asn Asp Ser Ser Thr Asp
290 295 300

Lys Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn
305 310 315 320

Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly
325 330 335

Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe
340 345 350

Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly
355 360 365

Asn Ile Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val
370 375 380

Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala
385 390 395 400

Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly

405 410 415

Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile
420 425 430

Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln
435 440 445

Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser
450 455 460

Val Asp Asp Glu Gly Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys
465 470 475 480

Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val
485 490 495

Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn His
500 505 510

Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile
515 520 525

Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met
530 535 540

Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly
545 550 555 560

Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala
565 570 575

Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr
580 585 590

Gln Trp

<210> 5
<211> 591
<212> PRT
<213> Neisseria meningitidis

<400> 5

Met Asn Glu Ile Leu Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Ala Asn Asn Glu Glu Gln Glu Glu Asp Leu Tyr Leu Asp Pro
50 55 60

```
Val Leu Arg Thr Val Ala Val Leu Ile Val Asn Ser Asp Lys Glu Gly
65                  70                  75                  80

Thr Gly Glu Lys Glu Lys Val Glu Glu Asn Ser Asp Trp Ala Val Tyr
                85                  90                  95

Phe Asn Glu Lys Gly Val Leu Thr Ala Arg Glu Ile Thr Leu Lys Ala
            100                 105                 110

Gly Asp Asn Leu Lys Ile Lys Gln Asn Gly Thr Asn Phe Thr Tyr Ser
        115                 120                 125

Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Gly Thr Glu Lys Leu
    130                 135                 140

Ser Phe Ser Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp Thr Lys
145                 150                 155                 160

Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr
                165                 170                 175

Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Leu Asn
            180                 185                 190

Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu
        195                 200                 205

Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn
    210                 215                 220

Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe
225                 230                 235                 240

Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr
                245                 250                 255

Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val
            260                 265                 270

Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu
        275                 280                 285

Val Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly
    290                 295                 300

Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala
305                 310                 315                 320

Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala
                325                 330                 335

Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser
            340                 345                 350

Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile
        355                 360                 365
```

Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln
370 375 380

Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser
385 390 395 400

Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met
405 410 415

Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg
420 425 430

Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser
435 440 445

Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp
450 455 460

Gly Asp Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val Arg
465 470 475 480

Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val
485 490 495

Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn
500 505 510

Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala
515 520 525

Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly
530 535 540

Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser
545 550 555 560

Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn
565 570 575

Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
580 585 590

<210> 6
<211> 599
<212> PRT
<213> Neisseria meningitidis

<400> 6

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Ala Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

```
Ala Asn Ala Thr Asp Glu Asp Glu Glu Glu Glu Leu Glu Pro Val Val
    50                  55                  60

Arg Ser Ala Leu Val Leu Gln Phe Met Ile Asp Lys Glu Gly Asn Gly
65                  70                  75                  80

Glu Asn Glu Ser Thr Gly Asn Ile Gly Trp Ser Ile Tyr Tyr Asp Asn
                85                  90                  95

His Asn Thr Leu His Gly Ala Thr Val Thr Leu Lys Ala Gly Asp Asn
            100                 105                 110

Leu Lys Ile Lys Gln Asn Thr Asn Lys Asn Thr Asn Glu Asn Thr Asn
        115                 120                 125

Asp Ser Ser Phe Thr Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr
    130                 135                 140

Ser Val Glu Thr Glu Lys Leu Ser Phe Gly Ala Asn Gly Asn Lys Val
145                 150                 155                 160

Asn Ile Thr Ser Asp Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala
                165                 170                 175

Gly Thr Asn Gly Asp Thr Thr Val His Leu Asn Gly Ile Gly Ser Thr
            180                 185                 190

Leu Thr Asp Thr Leu Leu Asn Thr Gly Ala Thr Thr Asn Val Thr Asn
        195                 200                 205

Asp Asn Val Thr Asp Asp Lys Lys Lys Arg Ala Ala Ser Val Lys Asp
    210                 215                 220

Val Leu Asn Ala Gly Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr
225                 230                 235                 240

Ala Ser Asp Asn Val Asp Phe Val His Thr Tyr Asp Thr Val Glu Phe
                245                 250                 255

Leu Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp
            260                 265                 270

Asn Gly Lys Arg Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile
        275                 280                 285

Lys Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Gly Lys Gly Glu Asn
    290                 295                 300

Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val
305                 310                 315                 320

Ile Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala
                325                 330                 335

Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly
            340                 345                 350
```

Thr Asn Val Thr Phe Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser
355 360 365

Lys Asp Asp Gln Gly Asn Ile Thr Val Lys Tyr Asp Val Asn Val Gly
370 375 380

Asp Ala Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp
385 390 395 400

Ser Lys Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val
405 410 415

Ser Pro Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly
420 425 430

Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr
435 440 445

Ser Met Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp
450 455 460

Ala Pro Thr Leu Ser Val Asp Asp Lys Gly Ala Leu Asn Val Gly Ser
465 470 475 480

Lys Asp Ala Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val
485 490 495

Lys Glu Gly Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln
500 505 510

Asn Leu Asn Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly
515 520 525

Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro
530 535 540

Gly Lys Ser Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala
545 550 555 560

Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile
565 570 575

Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser
580 585 590

Ala Ser Val Gly Tyr Gln Trp
595

<210> 7
<211> 598
<212> PRT
<213> Neisseria meningitidis

<400> 7

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp

```
1               5                   10                  15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
            20                  25                  30

Thr Val Ala Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
        35                  40                  45

Ala Asn Ala Thr Asp Asp Asp Asp Leu Tyr Leu Glu Pro Val Gln Arg
    50                  55                  60

Thr Ala Val Val Leu Ser Phe Arg Ser Asp Lys Glu Gly Thr Gly Glu
65                  70                  75                  80

Lys Glu Gly Thr Glu Asp Ser Asn Trp Ala Val Tyr Phe Asp Glu Lys
                85                  90                  95

Arg Val Leu Lys Ala Gly Ala Ile Thr Leu Lys Ala Gly Asp Asn Leu
            100                 105                 110

Lys Ile Lys Gln Asn Thr Asn Glu Asn Thr Asn Glu Asn Thr Asn Asp
        115                 120                 125

Ser Ser Phe Thr Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser
    130                 135                 140

Val Glu Thr Glu Lys Leu Ser Phe Gly Ala Asn Gly Asn Lys Val Asn
145                 150                 155                 160

Ile Thr Ser Asp Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly
                165                 170                 175

Thr Asn Gly Asp Pro Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu
            180                 185                 190

Thr Asp Thr Leu Leu Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp
        195                 200                 205

Asn Val Thr Asp Asp Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val
    210                 215                 220

Leu Asn Ala Gly Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala
225                 230                 235                 240

Ser Asp Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu
                245                 250                 255

Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn
            260                 265                 270

Gly Lys Lys Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys
        275                 280                 285

Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Gly Lys Asp Glu Asn Gly
    290                 295                 300

Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile
```

A2

305 310 315 320

Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn
325 330 335

Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr
340 345 350

Lys Val Thr Phe Ala Ser Gly Asn Gly Thr Thr Ala Thr Val Ser Lys
355 360 365

Asp Asp Gln Gly Asn Ile Thr Val Lys Tyr Asp Val Asn Val Gly Asp
370 375 380

Ala Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser
385 390 395 400

Lys Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser
405 410 415

Pro Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn
420 425 430

Asn Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser
435 440 445

Met Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala
450 455 460

Pro Thr Leu Ser Val Asp Asp Glu Gly Ala Leu Asn Val Gly Ser Lys
465 470 475 480

Asp Ala Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys
485 490 495

Glu Gly Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn
500 505 510

Leu Asn Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile
515 520 525

Ala Gln Ala Ile Ala Thr Ala Gly Leu Ala Gln Ala Tyr Leu Pro Gly
530 535 540

Lys Ser Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly
545 550 555 560

Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp Thr Gly Asn Trp Val Ile
565 570 575

Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala
580 585 590

Ser Val Gly Tyr Gln Trp
595

<210> 8

<211> 598
<212> PRT
<213> Neisseria meningitidis

<400> 8

Met Asn Lys Ile Ser Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Ala Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Asn Ala Thr Asp Asp Asp Asp Leu Tyr Leu Glu Pro Val Gln Arg
50 55 60

Thr Ala Val Val Leu Ser Phe Arg Ser Asp Lys Glu Gly Thr Gly Glu
65 70 75 80

Lys Glu Gly Thr Glu Asp Ser Asn Trp Ala Val Tyr Phe Asp Glu Lys
85 90 95

Arg Val Leu Lys Ala Gly Ala Ile Thr Leu Lys Ala Gly Asp Asn Leu
100 105 110

Lys Ile Lys Gln Asn Thr Asn Glu Asn Thr Asn Glu Asn Thr Asn Asp
115 120 125

Ser Ser Phe Thr Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser
130 135 140

Val Glu Thr Glu Lys Leu Ser Phe Gly Ala Asn Gly Asn Lys Val Asn
145 150 155 160

Ile Thr Ser Asp Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly
165 170 175

Thr Asn Gly Asp Pro Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu
180 185 190

Thr Asp Thr Leu Leu Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp
195 200 205

Asn Val Thr Asp Asp Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val
210 215 220

Leu Asn Ala Gly Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala
225 230 235 240

Ser Asp Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu
245 250 255

Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn
260 265 270

Gly Lys Arg Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys
275 280 285

Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Gly Lys Gly Glu Asn Gly
290 295 300

Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile
305 310 315 320

Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn
325 330 335

Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr
340 345 350

Lys Val Thr Phe Ala Ser Gly Asn Gly Thr Thr Ala Thr Val Ser Lys
355 360 365

Asp Asp Gln Gly Asn Ile Thr Val Lys Tyr Asp Val Asn Val Gly Asp
370 375 380

Ala Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser
385 390 395 400

Lys Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser
405 410 415

Pro Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn
420 425 430

Asn Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser
435 440 445

Met Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala
450 455 460

Pro Thr Leu Ser Val Asp Asp Glu Gly Ala Leu Asn Val Gly Ser Lys
465 470 475 480

Asp Ala Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys
485 490 495

Glu Gly Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn
500 505 510

Leu Asn Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile
515 520 525

Ala Gln Ala Ile Ala Thr Ala Gly Leu Ala Gln Ala Tyr Leu Pro Gly
530 535 540

Lys Ser Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly
545 550 555 560

Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp Thr Gly Asn Trp Val Ile
565 570 575

Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Thr Ser Ala
580 585 590

Ser Val Gly Tyr Gln Trp
595

<210> 9
<211> 594
<212> PRT
<213> Neisseria meningitidis

<400> 9

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Ala Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Asn Ala Thr Asp Asp Asp Asp Leu Tyr Leu Glu Pro Val Gln Arg
50 55 60

Thr Ala Val Val Leu Ser Phe Arg Ser Asp Lys Glu Gly Thr Gly Glu
65 70 75 80

Lys Glu Gly Thr Glu Asp Ser Asn Trp Ala Val Tyr Phe Asp Glu Lys
85 90 95

Arg Val Leu Lys Ala Gly Ala Ile Thr Leu Lys Ala Gly Asp Asn Leu
100 105 110

Lys Ile Lys Gln Asn Thr Asn Glu Asn Thr Asn Asp Ser Ser Phe Thr
115 120 125

Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Glu Thr Glu
130 135 140

Lys Leu Ser Phe Gly Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp
145 150 155 160

Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp
165 170 175

Pro Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu
180 185 190

Leu Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp
195 200 205

Asp Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly
210 215 220

Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val
225 230 235 240

```
Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr
                245                 250                 255

Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr
            260                 265                 270

Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly
        275                 280                 285

Lys Leu Val Thr Gly Lys Gly Lys Asp Glu Asn Gly Ser Ser Thr Asp
    290                 295                 300

Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn
305                 310                 315                 320

Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly
                325                 330                 335

Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe
            340                 345                 350

Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly
        355                 360                 365

Asn Ile Thr Val Lys Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val
    370                 375                 380

Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala
385                 390                 395                 400

Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly
                405                 410                 415

Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile
            420                 425                 430

Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Ala Pro Gln
        435                 440                 445

Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser
    450                 455                 460

Val Asp Asp Glu Gly Ala Leu Asn Val Gly Ser Lys Asp Thr Asn Lys
465                 470                 475                 480

Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val
                485                 490                 495

Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg
            500                 505                 510

Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile
        515                 520                 525

Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met
    530                 535                 540
```

```
Ala Ile Gly Gly Asp Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly
545                 550                 555                 560

Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala
                565                 570                 575

Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr
            580                 585                 590

Gln Trp
```

<210> 10
<211> 592
<212> PRT
<213> Neisseria meningitidis

<400> 10

```
Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1               5                   10                  15

Val Ala Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
            20                  25                  30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
        35                  40                  45

Ala Asn Ala Thr Asp Glu Asp Glu Glu Glu Glu Leu Glu Ser Val Gln
    50                  55                  60

Arg Ser Val Val Gly Ser Ile Gln Ala Ser Met Glu Gly Ser Gly Glu
65                  70                  75                  80

Leu Glu Thr Ile Ser Leu Ser Met Thr Asn Asp Ser Lys Glu Phe Val
                85                  90                  95

Asp Pro Tyr Ile Val Val Thr Leu Lys Ala Gly Asp Asn Leu Lys Ile
            100                 105                 110

Lys Gln Asn Thr Asn Glu Asn Thr Asn Ala Ser Ser Phe Thr Tyr Ser
        115                 120                 125

Leu Lys Lys Asp Leu Thr Gly Leu Ile Asn Val Glu Thr Glu Lys Leu
    130                 135                 140

Ser Phe Gly Ala Asn Gly Lys Lys Val Asn Ile Ile Ser Asp Thr Lys
145                 150                 155                 160

Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr
                165                 170                 175

Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Ala Gly
            180                 185                 190

Ser Ser Ala Ser His Val Asp Ala Gly Asn Gln Ser Thr His Tyr Thr
```

```
        195                 200                 205

Arg Ala Ala Ser Ile Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys
    210                 215                 220

Gly Val Lys Thr Gly Ser Thr Thr Gly Gln Ser Glu Asn Val Asp Phe
225                 230                 235                 240

Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr
                245                 250                 255

Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Arg Thr Glu Val
            260                 265                 270

Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu
        275                 280                 285

Val Thr Gly Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly
    290                 295                 300

Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala
305                 310                 315                 320

Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala
                325                 330                 335

Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser
            340                 345                 350

Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile
        355                 360                 365

Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln
    370                 375                 380

Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser
385                 390                 395                 400

Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met
                405                 410                 415

Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Ser Arg
            420                 425                 430

Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Ala Pro Gln Phe Ser
        435                 440                 445

Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp
    450                 455                 460

Asp Glu Gly Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro Val
465                 470                 475                 480

Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn
                485                 490                 495

Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp
```

```
            500                 505                 510

Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr
        515                 520                 525

Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile
    530                 535                 540

Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser
545                 550                 555                 560

Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly
                565                 570                 575

Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
            580                 585                 590
```

<210> 11
<211> 604
<212> PRT
<213> Neisseria meningitidis

<220>
<221> misc_feature
<223> "X" is any or absent amino acid at a corresponding position in any one of SEQ ID NOS 1-10 or a conservative substitution thereo

<400> 11

```
Met Asn Xaa Ile Xaa Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1               5                   10                  15

Val Xaa Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
            20                  25                  30

Thr Val Xaa Thr Ala Val Leu Ala Thr Leu Leu Xaa Ala Thr Val Gln
        35                  40                  45

Ala Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Leu Xaa Xaa
    50                  55                  60

Val Xaa Arg Xaa Xaa Xaa Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Glu Gly
65                  70                  75                  80

Xaa Xaa Glu Xaa Glu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                85                  90                  95

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Thr Leu Lys Ala
            100                 105                 110

Gly Asp Asn Leu Lys Ile Lys Gln Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
        115                 120                 125

Xaa Xaa Xaa Xaa Xaa Xaa Phe Thr Tyr Ser Leu Lys Lys Xaa Leu Xaa
    130                 135                 140
```

Xaa Leu Xaa Xaa Val Xaa Thr Glu Lys Leu Ser Phe Xaa Ala Asn Xaa
145 150 155 160

Xaa Lys Val Asn Ile Xaa Ser Asp Thr Lys Gly Leu Asn Phe Ala Lys
165 170 175

Xaa Thr Ala Xaa Thr Asn Gly Asp Xaa Thr Val His Leu Asn Gly Ile
180 185 190

Gly Ser Thr Leu Thr Asp Xaa Leu Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa
195 200 205

Xaa Xaa Xaa Xaa Xaa Xaa Thr Xaa Xaa Xaa Xaa Xaa Arg Ala Ala Ser
210 215 220

Xaa Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys Gly Val Lys Xaa
225 230 235 240

Gly Xaa Thr Xaa Xaa Xaa Xaa Xaa Asn Val Asp Phe Val Xaa Thr Tyr
245 250 255

Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr Val Asn
260 265 270

Val Glu Ser Lys Asp Asn Gly Lys Xaa Thr Glu Val Lys Ile Gly Ala
275 280 285

Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr Gly Lys
290 295 300

Xaa Lys Xaa Glu Asn Xaa Ser Ser Thr Asp Xaa Gly Glu Gly Leu Val
305 310 315 320

Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp Arg Met
325 330 335

Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu
340 345 350

Thr Val Thr Ser Gly Thr Xaa Val Thr Phe Ala Ser Gly Xaa Gly Thr
355 360 365

Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val Xaa Tyr
370 375 380

Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln Asn Ser
385 390 395 400

Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly Lys Val
405 410 415

Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu Thr Val
420 425 430

Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Xaa Arg Asn Gly Lys Asn
435 440 445

Ile Asp Ile Ala Thr Ser Met Xaa Pro Gln Phe Ser Ser Val Ser Leu
450 455 460

Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Xaa Xaa Xaa Ala
465 470 475 480

Leu Asn Val Gly Ser Lys Xaa Xaa Asn Lys Pro Val Arg Ile Thr Asn
485 490 495

Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala Gln Leu
500 505 510

Lys Gly Val Ala Gln Asn Leu Asn Asn Xaa Ile Asp Asn Val Xaa Gly
515 520 525

Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu Xaa
530 535 540

Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly Xaa Thr
545 550 555 560

Tyr Xaa Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Xaa
565 570 575

Xaa Gly Asn Trp Xaa Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly
580 585 590

His Phe Gly Xaa Ser Ala Ser Val Gly Tyr Gln Trp
595 600

<210> 12
<211> 1776
<212> DNA
<213> Neisseria meningitidis

<400> 12
atgaacaaaa tataccgcat catttggaat agtgccctca atgcatgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

actctgttgt ttgcaacggt tcaggcaagt gctaacaatg aagagcaaga agaagattta 180

tatttagacc ccgtacaacg cactgttgcc gtgttgatag tcaattccga taaagaaggc 240

acgggagaaa aagaaaaagt agaagaaaat tcagattggg cagtatattt caacgagaaa 300

ggagtactaa cagccagaga aatcaccctc aaagccggcg acaacctgaa aatcaaacaa 360

aacggcacaa acttcaccta ctcgctgaaa aaagacctca cagatctgac cagtgttgga 420

actgaaaaat tatcgtttag cgcaaacggc aataaagtca acatcacaag cgacaccaaa 480

ggcttgaatt ttgcgaaaga aacggctggg acgaacggcg acaccacggt tcatctgaac 540

ggtattggtt cgactttgac cgatacgctg ctgaataccg gagcgaccac aaacgtaacc 600

aacgacaacg ttaccgatga cgagaaaaaa cgtgcggcaa gcgttaaaga cgtattaaac 660

gctggctgga acattaaagg cgttaaaccc ggtacaacag cttccgataa cgttgatttc 720

gtccgcactt acgacacagt cgagttcttg agcgcagata cgaaaacaac gactgttaat 780

gtggaaagca aagacaacgg caagaaaacc gaagttaaaa tcggtgcgaa gacttctgtt 840

attaaagaaa aagacggtaa gttggttact ggtaaagaca aaggcgagaa tggttcttct 900

acagacgaag gcgaaggctt agtgactgca aaagaagtga ttgatgcagt aaacaaggct 960

ggttggagaa tgaaaacaac aaccgctaat ggtcaaacag gtcaagctga caagtttgaa 1020

accgttacat caggcacaaa tgtaaccttt gctagtggta aaggtacaac tgcgactgta 1080

agtaaagatg atcaaggcaa catcactgtt atgtatgatg taaatgtcgg cgatgcccta 1140

aacgtcaatc agctgcaaaa cagcggttgg aatttggatt ccaaagcggt tgcaggttct 1200

tcgggcaaag tcatcagcgg caatgtttcg ccgagcaagg gaaagatgga tgaaaccgtc 1260

aacattaatg ccggcaacaa catcgagatt acccgcaacg gtaaaaatat cgacatcgcc 1320

acttcgatga ccccgcagtt ttccagcgtt tcgctcggcg cgggggcgga tgcgcccact 1380

ttgagcgtgg atggggacgc attgaatgtc ggcagcaaga aggacaacaa acccgtccgc 1440

attaccaatg tcgccccggg cgttaaagag ggggatgtta caaacgtcgc acaacttaaa 1500

ggcgtggcgc aaaacttgaa caaccgcatc gacaatgtgg acggcaacgc gcgtgcgggc 1560

atcgcccaag cgattgcaac cgcaggtctg gttcaggcgt atttgcccgg caagagtatg 1620

atggcgatcg gcggcggcac ttatcgcggc gaagccggtt acgccatcgg ctactccagt 1680

atttccgacg gcggaaattg gattatcaaa ggcacggctt ccggcaattc gcgcggccat 1740

ttcggtgctt ccgcatctgt cggttatcag tggtaa 1776

<210> 13
<211> 1779
<212> DNA
<213> Neisseria meningitidis

<400> 13
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgccgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg aagatgaaga agaagagtta 180

gaatccgtac aacgctctgt cgtagggagc attcaagcca gtatggaagg cagcgtcgaa 240

ttggaaacga tatcattatc aatgactaac gacagcaagg aatttgtaga cccatacata 300

gtagttaccc tcaaagccgg cgacaacctg aaaatcaaac aaaacaccaa tgaaaacacc 360

aatgccagta gcttcaccta ctcgctgaaa aaagacctca caggcctgat caatgttgaa 420

actgaaaaat tatcgtttgg cgcaaacggc aagaaagtca acatcataag cgacaccaaa 480

ggcttgaatt tcgcgaaaga aacggctggg acgaacggcg acaccacggt tcatctgaac 540

ggtatcggtt cgactttgac cgatatgctg ctgaataccg gagcgaccac aaacgtaacc 600

aacgacaacg ttaccgatga cgagaaaaaa cgtgcggcaa gcgttaaaga cgtattaaac 660

gcaggctgga acattaaagg cgttaaaccc ggtacaacag cttccgataa cgttgatttc 720

gtccgcactt acgacacagt cgagttcttg agcgcagata cgaaaacaac gactgttaat 780

gtggaaagca aagacaacgg caagaaaacc gaagttaaaa tcggtgcgaa gacttctgtt 840

attaaagaaa aagacggtaa gttggttact ggtaaaggca aaggcgagaa tggttcttct 900

acagacgaag gcgaaggctt agtgactgca aaagaagtga ttgatgcagt aaacaaggct 960

ggttggagaa tgaaaacaac aaccgctaat ggtcaaacag gtcaagctga caagtttgaa 1020

accgttacat caggcacaaa agtaaccttt gctagtggta atggtacaac tgcgactgta 1080

agtaaagatg atcaaggcaa catcactgtt aagtatgatg taaatgtcgg cgatgcccta 1140

aacgtcaatc agctgcaaaa cagcggttgg aatttggatt ccaaagcggt tgcaggttct 1200

tcgggcaaag tcatcagcgg caatgtttcg ccgagcaagg gaaagatgga tgaaaccgtc 1260

aacattaatg ccggcaacaa catcgagatt acccgcaacg gcaaaaatat cgacatcgcc 1320

acttcgatga ccccgcaatt ttccagcgtt tcgctcggcg cgggggcgga tgcgcccact 1380

ttaagcgtgg atgacgaggg cgcgttgaat gtcggcagca aggatgccaa caaacccgtc 1440

cgcattacca atgtcgcccc gggcgttaaa gaggggatg ttacaaacgt cgcgcaactt 1500

aaaggtgtgg cgcaaaactt gaacaaccgc atcgacaatg tgaacggcaa cgcgcgtgcg 1560

ggcatcgccc aagcgattgc aaccgcaggt ctggttcagg cgtatctgcc cggcaagagt 1620

atgatggcga tcggcggcgg cacttatctc ggcgaagccg gttatgccat cggctactca 1680

agcatttccg ccggcggaaa ttggattatc aaaggcacgg cttccggcaa ttcgcgcggc 1740

catttcggtg cttccgcatc tgtcggttat cagtggtaa 1779

<210> 14
<211> 1770
<212> DNA
<213> Neisseria meningitidis

<400> 14
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt agtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tggcgaccgc cgtattggcg 120

acactgctgt ccgcaacggt tcaggcgaat gctaccgata ccgatgaaga tgaagagtta 180

gaatccgtag cacgctctgc tctggtgttg caattcatga tcgataaaga aggcaatgga 240

gaaatcgaat ctacaggaga tataggttgg agtatatatt acgacgatca caacactcta 300

cacggcgcaa ccgttaccct caaagccggc gacaacctga aaatcaaaca aagcggcaaa 360

gacttcacct actcgctgaa aaaagagctg aaagacctga ccagtgttga aactgaaaaa 420

ttatcgtttg gcgcaaacgg taataaagtc aacatcacaa gcgacaccaa aggcttgaat 480

tttgcgaaag aaacggctgg gacgaacggc gaccccacgg ttcatctgaa cggtatcggt 540

tcgactttga ccgatacgct tgcgggttct tctgcttctc acgttgatgc gggtaaccaa 600

agtacacatt acactcgtgc agcaagtatt aaggatgtgt tgaatgcggg ttggaatatt 660

aagggtgtta aaactggctc aacaactggt caatcagaaa atgtcgattt cgtccgcact 720

tacgacacag tcgagttctt gagcgcagat acgaaaacaa cgactgttaa tgtggaaagc 780

aaagacaacg gcaagagaac cgaagttaaa atcggtgcga agacttctgt tattaaagaa 840

aaagacggta agttggttac tggtaaaggc aaaggcgaga atggttcttc tacagacgaa 900

ggcgaaggct tagtgactgc aaaagaagtg attgatgcag taaacaaggc tggttggaga 960

atgaaaacaa caaccgctaa tggtcaaaca ggtcaagctg acaagtttga aaccgttaca 1020

tcaggcacaa aagtaacctt tgctagtggt aatggtacaa ctgcgactgt aagtaaagat 1080

gatcaaggca acatcactgt taagtatgat gtaaatgtcg gcgatgccct aaacgtcaat 1140

cagctgcaaa acagcggttg gaatttggat tccaaagcgg ttgcaggttc ttcgggcaaa 1200

gtcatcagcg gcaatgtttc gccgagcaag ggaaagatgg atgaaaccgt caacattaat 1260

gccggcaaca acatcgagat tacccgcaac ggcaaaaata tcgacatcgc cacttcgatg 1320

accccgcaat tttccagcgt ttcgctcggc gcgggggcgg atgcgcccac tttaagcgtg 1380

gatgacgagg gcgcgttgaa tgtcggcagc aaggatgcca acaaacccgt ccgcattacc 1440

aatgtcgccc cgggcgttaa agaggggat gttacaaacg tcgcacaact taaaggtgtg 1500

gcgcaaaact tgaacaaccg catcgacaat gtgaacggca acgcgcgcgc gggtatcgcc 1560

caagcgattg caaccgcagg tttggctcag gcctatttgc ccggcaagag tatgatggcg 1620

atcggcggcg gtacttatct cggcgaagcc ggttacgcca tcggctactc gagcatttct 1680

gacactggga attgggttat caagggcacg gcttccggca attcgcgcgg tcatttcggt 1740

A2

EP 0 742 279 B1

acttccgcat ctgtcggtta tcagtggtaa 1770

<210> 15
<211> 1785
<212> DNA
<213> Neisseria meningitidis

<400> 15
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgccgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tggcgaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgagt actaccgatg acgacgattt atatttagaa 180

cccgtacaac gcactgctgt cgtgttgagc ttccgttccg ataaagaagg cacgggagaa 240

aaagaagtta cagaagattc aaattgggga gtatatttcg acaagaaagg agtactaaca 300

gccggaacaa tcaccctcaa agccggcgac aacctgaaaa tcaaacaaaa caccaatgaa 360

aacaccaatg ccagtagctt cacctactcg ctgaaaaaag acctcacaga tctgaccagt 420

gttggaactg aaaaattatc gtttagcgca aacagcaata aagtcaacat cacaagcgac 480

accaaaggct tgaatttcgc gaaaaaaacg gctgagacca acggcgacac cacggttcat 540

ctgaacggta tcggttcgac tttgaccgat acgctgctga ataccggagc gaccacaaac 600

gtaaccaacg acaacgttac cgatgacgag aaaaaacgtg cggcaagcgt taaagacgta 660

ttaaacgcag gctggaacat taaaggcgtt aaacccggta caacagcttc cgataacgtt 720

gatttcgtcc gcacttacga cacagtcgag ttcttgagcg cagatacgaa aacaacgact 780

gttaatgtgg aaagcaaaga caacggcaag agaaccgaag ttaaaatcgg tgcgaagact 840

tctgttatca aagaaaaaga cggtaagttg gttactggta aagacaaagg cgagaatgat 900

tcttctacag acaaaggcga aggcttagtg actgcaaaag aagtgattga tgcagtaaac 960

aaggctggtt ggagaatgaa aacaacaacc gctaatggtc aaacaggtca agctgacaag 1020

tttgaaaccg ttacatcagg cacaaatgta acctttgcta gtggtaaagg tacaactgcg 1080

actgtaagta aagatgatca aggcaacatc actgttatgt atgatgtaaa tgtcggcgat 1140

gccctaaacg tcaatcagct gcaaaacagc ggttggaatt tggattccaa agcggttgca 1200

ggttcttcgg gcaaagtcat cagcggcaat gtttcgccga gcaagggaaa gatggatgaa 1260

accgtcaaca ttaatgccgg caacaacatc gagattaccc gcaacggcaa aaatatcgac 1320

atcgccactt cgatgacccc gcaattttcc agcgtttcgc tcggcgcggg ggcggatgcg 1380

cccactttaa gcgtggatga cgagggcgcg ttgaatgtcg gcagcaagga tgccaacaaa 1440

cccgtccgca ttaccaatgt cgccccgggc gttaaagagg gggatgttac aaacgtcgca 1500

caacttaaag gcgtggcgca aaacttgaac aaccacatcg acaatgtgga cggcaacgcg 1560

cgtgcgggca tcgcccaagc gattgcaacc gcaggtctgg ttcaggcgta tctgcccggc 1620

aagagtatga tggcgatcgg cggcggcact tatcgcggcg aagccggtta tgccatcggc 1680

tactcaagca tttccgacgg cggaaattgg attatcaaag gcacggcttc cggcaattcg 1740

cgcggccatt tcggtgcttc cgcatctgtc ggttatcagt ggtaa 1785

<210> 16
<211> 1776
<212> DNA
<213> Neisseria meningitidis

<400> 16
atgaacgaaa tattgcgcat catttggaat agcgccctca atgcctgggt cgttgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

actctgttgt ttgcaacggt tcaggcaagt gctaacaatg aagagcaaga agaagattta 180

tatttagacc ccgtgctacg cactgttgcc gtgttgatag tcaattccga taaagaaggc 240

acgggagaaa aagaaaaagt agaagaaaat tcagattggg cagtatattt caacgagaaa 300

ggagtactaa cagccagaga aatcaccctc aaagccggcg acaacctgaa aatcaaacaa 360

aacggcacaa acttcaccta ctcgctgaaa aaagacctca cagatctgac cagtgttgga 420

actgaaaaat tatcgtttag cgcaaacggc aataaagtca acatcacaag cgacaccaaa 480

ggcttgaatt ttgcgaaaga aacggctggg acgaacggcg acaccacggt tcatctgaac 540

ggtattggtt cgactttgac cgatacgctg ctgaataccg gagcgaccac aaacgtaacc 600

aacgacaacg ttaccgatga cgagaaaaaa cgtgcggcaa gcgttaaaga cgtattaaac 660

gctggctgga acattaaagg cgttaaaccc ggtacaacag cttccgataa cgttgatttc 720

gtccgcactt acgacacagt cgagttcttg agcgcagata cgaaaacaac gactgttaat 780

gtggaaagca aagacaacgg caagaaaacc gaagttaaaa tcggtgcgaa gacttctgtt 840

attaaagaaa aagacggtaa gttggttact ggtaaagaca aaggcgagaa tggttcttct 900

acagacgaag gcgaaggctt agtgactgca aaagaagtga ttgatgcagt aaacaaggct 960

ggttggagaa tgaaaacaac aaccgctaat ggtcaaacag gtcaagctga caagtttgaa 1020

accgttacat caggcacaaa tgtaaccttt gctagtggta aaggtacaac tgcgactgta 1080

agtaaagatg atcaaggcaa catcactgtt atgtatgatg taaatgtcgg cgatgcccta 1140

aacgtcaatc agctgcaaaa cagcggttgg aatttggatt ccaaagcggt tgcaggttct 1200

tcgggcaaag tcatcagcgg caatgtttcg ccgagcaagg gaaagatgga tgaaaccgtc 1260

aacattaatg ccggcaacaa catcgagatt acccgcaacg gtaaaaatat cgacatcgcc 1320

acttcgatga ccccgcagtt ttccagcgtt tcgctcggcg cgggggcgga tgcgcccact 1380

ttgagcgtgg atggggacgc attgaatgtc ggcagcaaga aggacaacaa acccgtccgc 1440

attaccaatg tcgccccggg cgttaaagag ggggatgtta caaacgtcgc acaacttaaa 1500

ggcgtggcgc aaaacttgaa caaccgcatc gacaatgtgg acggcaacgc gcgtgcgggc 1560

atcgcccaag cgattgcaac cgcaggtctg gttcaggcgt atttgcccgg caagagtatg 1620

atggcgatcg gcggcggcac ttatcgcggc gaagccggtt acgccatcgg ctactccagt 1680

atttccgacg gcggaaattg gattatcaaa ggcacggctt ccggcaattc gcgcggccat 1740

ttcggtgctt ccgcatctgt cggttatcag tggtaa 1776

<210> 17
<211> 1800
<212> DNA
<213> Neisseria meningitidis

<400> 17
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgccgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

acgctgttgt ttgcaacggt tcaggcgaat gctaccgatg aagatgaaga agaagagtta 180

gaacccgtag tacgctctgc tctggtgttg caattcatga tcgataaaga aggcaatgga 240

gaaaacgaat ctacaggaaa tataggttgg agtatatatt acgacaatca caacactcta 300

cacggcgcaa ccgttaccct caaagccggc gacaacctga aaatcaaaca aaacaccaat 360

aaaaacacca atgaaaacac caatgacagt agcttcacct actcgctgaa aaaagacctc 420

acagatctga ccagtgttga aactgaaaaa ttatcgtttg gcgcaaacgg caataaagtc 480

aacatcacaa gcgacaccaa aggcttgaat ttcgcgaaag aaacggctgg gacgaacggc 540

gacaccacgg ttcatctgaa cggtattggt tcgactttga ccgatacgct gctgaatacc 600

ggagcgacca caaacgtaac caacgacaac gttaccgatg acaagaaaaa acgtgcggca 660

agcgttaaag acgtattaaa cgcaggctgg aacattaaag gcgttaaacc cggtacaaca 720

gcttccgata acgttgattt cgtccacact tacgacacag tcgagttctt gagcgcagat 780

acgaaaacaa cgactgttaa tgtggaaagc aaagacaacg gcaagagaac cgaagttaaa 840

atcggtgcga agacttctgt tattaaagaa aaagacggta agttggttac tggtaaaggc 900

aaaggcgaga atggttcttc tacagacgaa ggcgaaggct tagtgactgc aaaagaagtg 960

attgatgcag taaacaaggc tggttggaga atgaaaacaa caaccgctaa tggtcaaaca 1020

ggtcaagctg acaagtttga aaccgttaca tcaggcacaa atgtaacctt tgctagtggt 1080

aaaggtacaa ctgcgactgt aagtaaagat gatcaaggca acatcactgt taagtatgat 1140

gtaaatgtcg gcgatgccct aaacgtcaat cagctgcaaa acagcggttg gaatttggat 1200

tccaaagcgg ttgcaggttc ttcgggcaaa gtcatcagcg gcaatgtttc gccgagcaag 1260

ggaaagatgg atgaaaccgt caacattaat gccggcaaca acatcgagat tacccgcaac 1320

ggtaaaaata tcgacatcgc cacttcgatg accccgcagt tttccagcgt ttcgctcggc 1380

gcgggggcgg atgcgcccac tttgagcgtg gatgacaagg gcgcgttgaa tgtcggcagc 1440

aaggatgcca acaaacccgt ccgcattacc aatgtcgccc cgggcgttaa agaggggat 1500

gttacaaacg tcgcacaact taaaggcgtg gcgcaaaact tgaacaaccg catcgacaat 1560

gtggacggca acgcgcgtgc gggcatcgcc caagcgattg caaccgcagg tctggttcag 1620

gcgtatctgc ccggcaagag tatgatggcg atcggcggcg gcacttatcg cggcgaagcc 1680

ggttacgcca tcggctactc cagtatttcc gacggcggaa attggattat caaaggcacg 1740

gcttccggca attcgcgcgg tcatttcggt gcttccgcat ctgtcggtta tcagtggtaa 1800

<210> 18
<211> 1797
<212> DNA
<213> Neisseria meningitidis

<400> 18
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tggcgaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg acgacgattt atatttagaa 180

cccgtacaac gcactgctgt cgtgttgagc ttccgttccg ataaagaagg cacgggagaa 240

aaagaaggta cagaagattc aaattgggca gtatatttcg acgagaaaag agtactaaaa 300

gccggagcaa tcaccctcaa agccggcgac aacctgaaaa tcaaacaaaa caccaatgaa 360

aacaccaatg aaaacaccaa tgacagtagc ttcacctact ccctgaaaaa agacctcaca 420

gatctgacca gtgttgaaac tgaaaaatta tcgtttggcg caaacggtaa taaagtcaac 480

atcacaagcg acaccaaagg cttgaatttt gcgaaagaaa cggctgggac gaacggcgac 540

cccacggttc atctgaacgg tatcggttcg actttgaccg atacgctgct gaataccgga 600

gcgaccacaa acgtaaccaa cgacaacgtt accgatgacg agaaaaaacg tgcggcaagc 660

gttaaagacg tattaaacgc aggctggaac attaaaggcg ttaaacccgg tacaacagct 720

tccgataacg ttgatttcgt ccgcacttac gacacagtcg agttcttgag cgcagatacg 780

aaaacaacga ctgttaatgt ggaaagcaaa gacaacggca agaaaaccga agttaaaatc 840

ggtgcgaaga cttctgttat taaagaaaaa gacggtaagt tggttactgg taaaggcaaa 900

gacgagaatg gttcttctac agacgaaggc gaaggcttag tgactgcaaa agaagtgatt 960

gatgcagtaa acaaggctgg ttggagaatg aaaacaacaa ccgctaatgg tcaaacaggt 1020

caagctgaca agtttgaaac cgttacatca ggcacaaaag taacctttgc tagtggtaat 1080

ggtacaactg cgactgtaag taaagatgat caaggcaaca tcactgttaa gtatgatgta 1140

aatgtcggcg atgccctaaa cgtcaatcag ctgcaaaaca gcggttggaa tttggattcc 1200

aaagcggttg caggttcttc gggcaaagtc atcagcggca atgtttcgcc gagcaaggga 1260

aagatggatg aaaccgtcaa cattaatgcc ggcaacaaca tcgagattac ccgcaacggc 1320

aaaaatatcg acatcgccac ttcgatgacc ccgcaatttt ccagcgtttc gctcggcgcg 1380

ggggcggatg cgcccacttt aagcgtggat gacgagggcg cgttgaatgt cggcagcaag 1440

gatgccaaca aacccgtccg cattaccaat gtcgccccgg gcgttaaaga gggggatgtt 1500

acaaacgtcg cacaacttaa aggtgtggcg caaaacttga acaaccgcat cgacaatgtg 1560

gacggcaacg cgcgcgcggg tatcgcccaa gcgattgcaa ccgcaggttt ggctcaggcg 1620

tatttgcccg gcaagagtat gatggcgatc ggcggcggta cttatcgcgg cgaagccggt 1680

tacgccatcg gctactcgag catttctgac actgggaatt gggttatcaa gggcacggct 1740

tccggcaatt cgcgcggcca tttcggtgct tccgcatctg tcggttatca gtggtaa 1797

<210> 19
<211> 1797
<212> DNA
<213> Neisseria meningitidis

<400> 19
atgaacaaaa tatcccgcat catttggaat agtgccctca atgcctgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tggcgaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg acgacgattt atatttagaa 180

cccgtacaac gcactgctgt cgtgttgagc ttccgttccg ataaagaagg cacgggagaa 240

aaagaaggta cagaagattc aaattgggca gtatatttcg acgagaaaag agtactaaaa 300

gccggagcaa tcaccctcaa agccggcgac aacctgaaaa tcaaacaaaa caccaatgaa 360

aacaccaatg aaaacaccaa tgacagtagc ttcacctact ccctgaaaaa agacctcaca 420

gatctgacca gtgttgaaac tgaaaaatta tcgtttggcg caaacggtaa taaagtcaac 480

atcacaagcg acaccaaagg cttgaatttt gcgaaagaaa cggctgggac gaacggcgac 540

cccacggttc atctgaacgg tatcggttcg actttgaccg atacgctgct gaataccgga 600

gcgaccacaa acgtaaccaa cgacaacgtt accgatgacg agaaaaaacg tgcggcaagc 660

gttaaagacg tattaaacgc aggctggaac attaaaggcg ttaaacccgg tacaacagct 720

tccgataacg tcgatttcgt ccgcacttac gacacagtcg agttcttgag cgcagatacg 780

aaaacaacga ctgttaatgt ggaaagcaaa gacaacggca agagaaccga agttaaaatc 840

ggtgcgaaga cttctgttat taaagaaaaa gacggtaagt tggttactgg taaaggcaaa 900

ggcgagaatg gttcttctac agacgaaggc gaaggcttag tgactgcaaa agaagtgatt 960

gatgcagtaa acaaggctgg ttggagaatg aaaacaacaa ccgctaatgg tcaaacaggt 1020

caagctgaca agtttgaaac cgttacatca ggcacaaaag taacctttgc tagtggtaat 1080

ggtacaactg cgactgtaag taaagatgat caaggcaaca tcactgttaa gtatgatgta 1140

aatgtcggcg atgccctaaa cgtcaatcag ctgcaaaaca gcggttggaa tttggattcc 1200

aaagcggttg caggttcttc gggcaaagtc atcagcggca atgtttcgcc gagcaaggga 1260

aagatggatg aaaccgtcaa cattaatgcc ggcaacaaca tcgagattac ccgcaacggc 1320

aaaaatatcg acatcgccac ttcgatgacc ccgcaatttt ccagcgtttc gctcggcgcg 1380

ggggcggatg cgcccacttt aagcgtggat gacgagggcg cgttgaatgt cggcagcaag 1440

gatgccaaca aacccgtccg cattaccaat gtcgccccgg gcgttaaaga gggggatgtt 1500

acaaacgtcg cacaacttaa aggtgtggcg caaaacttga acaaccgcat cgacaatgtg 1560

gacggcaacg cgcgcgcggg tatcgcccaa gcgattgcaa ccgcaggttt ggctcaggcc 1620

tatttgcccg gcaagagtat gatggcgatc ggcggcggta cttatcgcgg cgaagccggt 1680

tacgccatcg gctactcgag catttctgac actgggaatt gggttatcaa gggcacggct 1740

tccggcaatt cgcgcggtca tttcggtact tccgcatctg tcggttatca gtggtaa 1797

<210> 20
<211> 1785
<212> DNA
<213> Neisseria meningitidis

<400> 20

atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tggcgaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg acgacgattt atatttagaa 180

cccgtacaac gcactgctgt cgtgttgagc ttccgttccg ataaagaagg cacgggagaa 240

aaagaaggta cagaagattc aaattgggca gtatatttcg acgagaaaag agtactaaaa 300

gccggagcaa tcaccctcaa agccggcgac aacctgaaaa tcaaacaaaa caccaatgaa 360

aacaccaatg acagtagctt cacctactcc ctgaaaaaag acctcacaga tctgaccagt 420

gttgaaactg aaaaattatc gtttggcgca aacggtaata aagtcaacat cacaagcgac 480

accaaaggct tgaattttgc gaaagaaacg gctgggacga acggcgaccc cacggttcat 540

ctgaacggta tcggttcgac tttgaccgat acgctgctga ataccggagc gaccacaaac 600

gtaaccaacg acaacgttac cgatgacgag aaaaaacgtg cggcaagcgt taaagacgta 660

ttaaacgcag gctggaacat taaaggcgtt aaacccggta caacagcttc cgataacgtt 720

gatttcgtcc gcacttacga cacagtcgag ttcttgagcg cagatacgaa aacaacgact 780

gttaatgtgg aaagcaaaga caacggcaag aaaaccgaag ttaaaatcgg tgcgaagact 840

tctgttatta aagaaaaaga cggtaagttg gttactggta aaggcaaaga cgagaatggt 900

tcttctacag acgaaggcga aggcttagtg actgcaaaag aagtgattga tgcagtaaac 960

aaggctggtt ggagaatgaa aacaacaacc gctaatggtc aaacaggtca agctgacaag 1020

tttgaaaccg ttacatcagg cacaaatgta acctttgcta gtggtaaagg tacaactgcg 1080

actgtaagta aagatgatca aggcaacatc actgttaagt atgatgtaaa tgtcggcgat 1140

gccctaaacg tcaatcagct gcaaaacagc ggttggaatt tggattccaa agcggttgca 1200

ggttcttcgg gcaaagtcat cagcggcaat gtttcgccga gcaagggaaa gatggatgaa 1260

accgtcaaca ttaatgccgg caacaacatc gagattaccc gcaacggtaa aaatatcgac 1320

atcgccactt cgatggcgcc gcagttttcc agcgtttcgc tcggtgcggg ggcggatgcg 1380

cccactttga gcgtggatga cgagggcgcg ttgaatgtcg gcagcaagga taccaacaaa 1440

cccgtccgca ttaccaatgt cgcccgggc gttaaagagg gggatgttac aaacgtcgca 1500

caacttaaag gcgtggcgca aaacttgaac aaccgcatcg acaatgtgga cggcaacgcg 1560

cgtgcgggca tcgcccaagc gattgcaacc gcaggtctag ttcaggcgta tctgcccggc 1620

aagagtatga tggcgatcgg cggcgacact tatcgcggcg aagccggtta cgccatcggc 1680

tactcaagta tttccgacgg cggaaattgg attatcaaag gcacggcttc cggcaattcg 1740

cgcggccatt tcggtgcttc cgcatctgtc ggttatcaat ggtaa 1785

<210> 21
<211> 1779
<212> DNA
<213> Neisseria meningitidis

<400> 21
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgccgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg aagatgaaga agaagagtta 180

gaatccgtac aacgctctgt cgtagggagc attcaagcca gtatggaagg cagcggcgaa 240

ttggaaacga tatcattatc aatgactaac gacagcaagg aatttgtaga cccatacata 300

gtagttaccc tcaaagccgg cgacaacctg aaaatcaaac aaaacaccaa tgaaaacacc 360

aatgccagta gcttcaccta ctcgctgaaa aaagacctca caggcctgat caatgttgaa 420

actgaaaaat tatcgtttgg cgcaaacggc aagaaagtca acatcataag cgacaccaaa 480

ggcttgaatt tcgcgaaaga aacggctggg acgaacggcg acaccacggt tcatctgaac 540

ggtatcggtt cgactttgac cgatacgctt gcgggttctt ctgcttctca cgttgatgcg 600

ggtaaccaaa gtacacatta cactcgtgca gcaagtatta aggatgtgtt gaatgcgggt 660

tggaatatta agggtgttaa aactggctca acaactggtc aatcagaaaa tgtcgatttc 720

gtccgcactt acgacacagt cgagttcttg agcgcagata cgaaaacaac gactgttaat 780

gtggaaagca aagacaacgg caagagaacc gaagttaaaa tcggtgcgaa gacttctgtt 840

attaaagaaa aagacggtaa gttggttact ggtaaaggca aaggcgagaa tggttcttct 900

acagacgaag gcgaaggctt agtgactgca aaagaagtga ttgatgcagt aaacaaggct 960

ggttggagaa tgaaaacaac aaccgctaat ggtcaaacag gtcaagctga caagtttgaa 1020

accgttacat caggcacaaa tgtaaccttt gctagtggta aaggtacaac tgcgactgta 1080

agtaaagatg atcaaggcaa catcactgtt atgtatgatg taaatgtcgg cgatgcccta 1140

aacgtcaatc agctgcaaaa cagcggttgg aatttggatt ccaaagcggt tgcaggttct 1200

tcgggcaaag tcatcagcgg caatgtttcg ccgagcaagg gaaagatgga tgaaaccgtc 1260

aacattaatg ccggcaacaa catcgagatt agccgcaacg gtaaaaatat cgacatcgcc 1320

acttcgatgg cgccgcagtt ttccagcgtt tcgctcggcg cgggggcaga tgcgcccact 1380

A2

ttaagcgtgg atgacgaggg cgcgttgaat gtcggcagca aggatgccaa caaacccgtc 1440

cgcattacca atgtcgcccc gggcgttaaa gaggggggatg ttacaaacgt cgcacaactt 1500

aaaggcgtgg cgcaaaactt gaacaaccgc atcgacaatg tggacggcaa cgcgcgtgcg 1560

ggcatcgccc aagcgattgc aaccgcaggt ctggttcagg cgtatctgcc cggcaagagt 1620

atgatggcga tcggcggcgg cacttatcgc ggcgaagccg gttacgccat cggctactcc 1680

agtatttccg acggcggaaa ttggattatc aaaggcacgg cttccggcaa ttcgcgcggc 1740

catttcggtg cttccgcatc tgtcggttat cagtggtaa 1779

<210> 22
<211> 1815
<212> DNA
<213> Neisseria meningitidis

<220>
<221> misc_feature
<223> "n" is any nucleotide, synonymous nucleotide or absent nucleotide at a corresponding position in any one of SEQ ID NOS:12-2

<400> 22
atgaacnaaa tatnncgcat catttggaat agngccctca atgcntgggt ngnngtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgnngaccgc cgtattggcg 120

acnctgntgt nngcaacggt tcaggcnant nctancnatn nngannnnnn nnnngannna 180

nanttagann ccgtnnnacg cnctgnnnnn gnnnnnnnnn tnnnnnncnn tanngaaggc 240

anngnngaan nngaannnnn annnnnnnnn nnnnnnnnnn nnnnnnannn nnnnnnnnnn 300

nnnnnnnnnn nnnnnnnnnn nntnaccctc aaagccggcg acaacctgaa aatcaaacaa 360

ancnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ncttcaccta ctcnctgaaa 420

aaaganctna nagnnctgan cantgttgna actgaaaaat tatcgtttng cgcaaacngn 480

aanaaagtca acatcanaag cgacaccaaa ggcttgaatt tngcgaaana aacggctgng 540

acnaacggcg acnccacggt tcatctgaac ggtatnggtt cgactttgac cgatangctn 600

nngnntncnn nngcnncnnn nnnngnnncn nnnnacnann ntacnnatna cnnnnnnann 660

cgtgcngcaa gnnttaanga ngtnttnaan gcnggntgga anattaangg ngttaaancn 720

ggnncaacan ctnnnnnntc nganaangtn gatttcgtcc ncacttacga cacagtcgag 780

ttcttgagcg cagatacgaa aacaacgact gttaatgtgg aaagcaaaga caacggcaag 840

anaaccgaag ttaaaatcgg tgcgaagact tctgttatna aagaaaaaga cggtaagttg 900

gttactggta aagncaaagn cgagaatgnt tcttctacag acnaaggcga aggcttagtg 960

actgcaaaag aagtgattga tgcagtaaac aaggctggtt ggagaatgaa aacaacaacc 1020

gctaatggtc aaacaggtca agctgacaag tttgaaaccg ttacatcagg cacaaangta 1080

acctttgcta gtggtaangg tacaactgcg actgtaagta aagatgatca aggcaacatc 1140

actgttangt atgatgtaaa tgtcggcgat gccctaaacg tcaatcagct gcaaaacagc 1200

ggttggaatt tggattccaa agcggttgca ggttcttcgg gcaaagtcat cagcggcaat 1260

gtttcgccga gcaagggaaa gatggatgaa accgtcaaca ttaatgccgg caacaacatc 1320

gagattancc gcaacggnaa aaatatcgac atcgccactt cgatgncncc gcanttttcc 1380

agcgtttcgc tcggngcggg ggcngatgcg cccactttna gcgtggatnn nnnggncgcn 1440

ttgaatgtcg gcagcaagna nnncaacaaa cccgtccgca ttaccaatgt cgccccgggc 1500

gttaaagagg gggatgttac aaacgtcgcn caacttaaag gngtggcgca aaacttgaac 1560

aaccncatcg acaatgtgna cggcaacgcg cgngcgggna tcgcccaagc gattgcaacc 1620

gcaggtntng ntcaggcnta tntgcccggc aagagtatga tggcgatcgg cggcgnnact 1680

tatcncggcg aagccggtta ngccatcggc tactcnagna tttcngncnn nggnaattgg 1740

nttatcaang gcacggcttc cggcaattcg cgcggncatt tcggtncttc cgcatctgtc 1800

ggttatcant ggtaa 1815

<210> 23
<211> 512
<212> PRT
<213> Neisseria meningitidis

<400> 23

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Ala Asn Asn Glu Thr Asp Leu Thr Ser Val Gly Thr Glu Lys
50 55 60

Leu Ser Phe Ser Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp Thr
65 70 75 80

Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr

```
                85                  90                  95

Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Leu
            100                 105                 110

Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp
        115                 120                 125

Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp
    130                 135                 140

Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp
145                 150                 155                 160

Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys
                165                 170                 175

Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu
            180                 185                 190

Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys
        195                 200                 205

Leu Val Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu
    210                 215                 220

Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys
225                 230                 235                 240

Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln
                245                 250                 255

Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala
            260                 265                 270

Ser Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn
        275                 280                 285

Ile Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn
    290                 295                 300

Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly
305                 310                 315                 320

Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys
                325                 330                 335

Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr
            340                 345                 350

Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe
        355                 360                 365

Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val
    370                 375                 380

Asp Gly Asp Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val
```

385 390 395 400

Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn
405 410 415

Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp
420 425 430

Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr
435 440 445

Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile
450 455 460

Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser
465 470 475 480

Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly
485 490 495

Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
500 505 510

<210> 24
<211> 513
<212> PRT
<213> Néisseria meningitidis

<400> 24

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Ala Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Asn Ala Thr Asp Glu Thr Gly Leu Ile Asn Val Glu Thr Glu Lys
50 55 60

Leu Ser Phe Gly Ala Asn Gly Lys Lys Val Asn Ile Ile Ser Asp Thr
65 70 75 80

Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr
85 90 95

Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Met Leu Leu
100 105 110

Asn Thr Gly Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp
115 120 125

Glu Lys Lys Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp
130 135 140

```
Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp
145                 150                 155                 160

Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys
                165                 170                 175

Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu
            180                 185                 190

Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys
        195                 200                 205

Leu Val Thr Gly Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu
    210                 215                 220

Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys
225                 230                 235                 240

Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln
                245                 250                 255

Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Lys Val Thr Phe Ala
            260                 265                 270

Ser Gly Asn Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn
        275                 280                 285

Ile Thr Val Lys Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn
    290                 295                 300

Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly
305                 310                 315                 320

Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys
                325                 330                 335

Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr
            340                 345                 350

Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe
        355                 360                 365

Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val
    370                 375                 380

Asp Asp Glu Gly Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro
385                 390                 395                 400

Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr
                405                 410                 415

Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile
            420                 425                 430

Asp Asn Val Asn Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala
        435                 440                 445
```

Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala
450 455 460

Ile Gly Gly Gly Thr Tyr Leu Gly Glu Ala Gly Tyr Ala Ile Gly Tyr
465 470 475 480

Ser Ser Ile Ser Ala Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser
485 490 495

Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln
500 505 510

Trp

<210> 25
<211> 407
<212> PRT
<213> Neisseria meningitidis

<400> 25

A2 Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Ala Asn Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu
50 55 60

Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys
65 70 75 80

Asp Asn Gly Lys Lys Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val
85 90 95

Ile Lys Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Asp Lys Gly Glu
100 105 110

Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu
115 120 125

Val Ile Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr
130 135 140

Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser
145 150 155 160

Gly Thr Asn Val Thr Phe Ala Ser Gly Lys Gly Thr Thr Ala Thr Val
165 170 175

Ser Lys Asp Asp Gln Gly Asn Ile Thr Val Met Tyr Asp Val Asn Val
180 185 190

Gly Asp Ala Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu
195 200 205

Asp Ser Lys Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn
210 215 220

Val Ser Pro Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala
225 230 235 240

Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala
245 250 255

Thr Ser Met Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala
260 265 270

Asp Ala Pro Thr Leu Ser Val Asp Gly Asp Ala Leu Asn Val Gly Ser
275 280 285

Lys Lys Asp Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val
290 295 300

Lys Glu Gly Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln
305 310 315 320

Asn Leu Asn Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly
325 330 335

Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro
340 345 350

Gly Lys Ser Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala
355 360 365

Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile
370 375 380

Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser
385 390 395 400

Ala Ser Val Gly Tyr Gln Trp
405

<210> 26
<211> 433
<212> PRT
<213> Neisseria meningitidis

<400> 26

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln

```
        35                  40                  45

Ala Ser Ala Asn Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly
    50                  55                  60

Trp Asn Ile Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val
65                  70                  75                  80

Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr
                85                  90                  95

Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr
            100                 105                 110

Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly
        115                 120                 125

Lys Leu Val Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp
    130                 135                 140

Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn
145                 150                 155                 160

Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly
                165                 170                 175

Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe
            180                 185                 190

Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly
        195                 200                 205

Asn Ile Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val
    210                 215                 220

Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala
225                 230                 235                 240

Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly
                245                 250                 255

Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile
            260                 265                 270

Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln
        275                 280                 285

Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser
    290                 295                 300

Val Asp Gly Asp Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro
305                 310                 315                 320

Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr
                325                 330                 335

Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile
```

340 345 350

Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala
355 360 365

Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala
370 375 380

Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr
385 390 395 400

Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser
405 410 415

Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln
420 425 430

Trp

<210> 27
<211> 502
<212> PRT
<213> Neisseria meningitidis

<400> 27

Met Asn Lys Ile Tyr Arg Ile Ile Trp Asn Ser Ala Leu Asn Ala Trp
1 5 10 15

Val Val Val Ser Glu Leu Thr Arg Asn His Thr Lys Arg Ala Ser Ala
20 25 30

Thr Val Lys Thr Ala Val Leu Ala Thr Leu Leu Phe Ala Thr Val Gln
35 40 45

Ala Ser Ala Asn Thr Leu Lys Ala Gly Asp Asn Leu Lys Ile Lys Gln
50 55 60

Phe Thr Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Gly
65 70 75 80

Thr Glu Lys Leu Ser Phe Ser Ala Asn Gly Asn Lys Val Asn Ile Thr
85 90 95

Ser Asp Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn
100 105 110

Gly Asp Thr Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp
115 120 125

Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys
130 135 140

Gly Val Lys Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe
145 150 155 160

Leu Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp
165 170 175

Asn Gly Lys Lys Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile
180 185 190

Lys Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Asp Lys Gly Glu Asn
195 200 205

Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val
210 215 220

Ile Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala
225 230 235 240

Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly
245 250 255

Thr Asn Val Thr Phe Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser
260 265 270

Lys Asp Asp Gln Gly Asn Ile Thr Val Met Tyr Asp Val Asn Val Gly
275 280 285

Asp Ala Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp
290 295 300

Ser Lys Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val
305 310 315 320

Ser Pro Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly
325 330 335

Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr
340 345 350

Ser Met Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp
355 360 365

Ala Pro Thr Leu Ser Val Asp Gly Asp Ala Leu Asn Val Gly Ser Lys
370 375 380

Lys Asp Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys
385 390 395 400

Glu Gly Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn
405 410 415

Leu Asn Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile
420 425 430

Ala Gln Ala Ile Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly
435 440 445

Lys Ser Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly
450 455 460

EP 1 270 605 A2

A2

Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile
465 470 475 480

Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala
485 490 495

Ser Val Gly Tyr Gln Trp
500

<210> 28
<211> 1539
<212> DNA
<213> Neisseria meningitidis

<400> 28
atgaacaaaa tataccgcat catttggaat agtgccctca atgcatgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

actctgttgt ttgcaacggt tcaggcaagt gctaacaatg aaacagatct gaccagtgtt 180

ggaactgaaa aattatcgtt tagcgcaaac ggcaataaag tcaacatcac aagcgacacc 240

aaaggcttga attttgcgaa agaaacggct gggacgaacg gcgacaccac ggttcatctg 300

aacggtattg gttcgacttt gaccgatacg ctgctgaata ccggagcgac cacaaacgta 360

accaacgaca acgttaccga tgacgagaaa aaacgtgcgg caagcgttaa agacgtatta 420

aacgctggct ggaacattaa aggcgttaaa cccggtacaa cagcttccga taacgttgat 480

ttcgtccgca cttacgacac agtcgagttc ttgagcgcag atacgaaaac aacgactgtt 540

aatgtggaaa gcaaagacaa cggcaagaaa accgaagtta aaatcggtgc gaagacttct 600

gttattaaag aaaaagacgg taagttggtt actggtaaag acaaaggcga gaatggttct 660

tctacagacg aaggcgaagg cttagtgact gcaaaagaag tgattgatgc agtaaacaag 720

gctggttgga gaatgaaaac aacaaccgct aatggtcaaa caggtcaagc tgacaagttt 780

gaaaccgtta catcaggcac aaatgtaacc tttgctagtg gtaaaggtac aactgcgact 840

gtaagtaaag atgatcaagg caacatcact gttatgtatg atgtaaatgt cggcgatgcc 900

ctaaacgtca atcagctgca aaacagcggt tggaatttgg attccaaagc ggttgcaggt 960

tcttcgggca aagtcatcag cggcaatgtt tcgccgagca agggaaagat ggatgaaacc 1020

gtcaacatta atgccggcaa caacatcgag attacccgca acggtaaaaa tatcgacatc 1080

gccacttcga tgaccccgca gttttccagc gtttcgctcg gcgcgggggc ggatgcgccc 1140

actttgagcg tggatgggga cgcattgaat gtcggcagca agaaggacaa caaacccgtc 1200

cgcattacca atgtcgcccc gggcgttaaa gaggggggatg ttacaaacgt cgcacaactt 1260

aaaggcgtgg cgcaaaactt gaacaaccgc atcgacaatg tggacggcaa cgcgcgtgcg 1320

ggcatcgccc aagcgattgc aaccgcaggt ctggttcagg cgtatttgcc cggcaagagt 1380

atgatggcga tcggcggcgg cacttatcgc ggcgaagccg gttacgccat cggctactcc 1440

agtatttccg acggcggaaa ttggattatc aaaggcacgg cttccggcaa ttcgcgcggc 1500

catttcggtg cttccgcatc tgtcggttat cagtggtaa 1539

<210> 29
<211> 1542
<212> DNA
<213> Neisseria meningitidis

<400> 29
atgaacaaaa tataccgcat catttggaat agtgccctca atgcctgggt cgccgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

acactgttgt ttgcaacggt tcaggcgaat gctaccgatg aaacaggcct gatcaatgtt 180

gaaactgaaa aattatcgtt tggcgcaaac ggcaagaaag tcaacatcat aagcgacacc 240

aaaggcttga atttcgcgaa agaaacggct gggacgaacg gcgacaccac ggttcatctg 300

aacggtatcg gttcgacttt gaccgatatg ctgctgaata ccggagcgac cacaaacgta 360

accaacgaca acgttaccga tgacgagaaa aaacgtgcgg caagcgttaa agacgtatta 420

aacgcaggct ggaacattaa aggcgttaaa cccggtacaa cagcttccga taacgttgat 480

ttcgtccgca cttacgacac agtcgagttc ttgagcgcag atacgaaaac aacgactgtt 540

aatgtggaaa gcaaagacaa cggcaagaaa accgaagtta aaatcggtgc gaagacttct 600

gttattaaag aaaaagacgg taagttggtt actggtaaag gcaaaggcga gaatggttct 660

tctacagacg aaggcgaagg cttagtgact gcaaaagaag tgattgatgc agtaaacaag 720

gctggttgga gaatgaaaac aacaaccgct aatggtcaaa caggtcaagc tgacaagttt 780

gaaaccgtta catcaggcac aaaagtaacc tttgctagtg gtaatggtac aactgcgact 840

gtaagtaaag atgatcaagg caacatcact gttaagtatg atgtaaatgt cggcgatgcc 900

ctaaacgtca atcagctgca aaacagcggt tggaatttgg attccaaagc ggttgcaggt 960

tcttcgggca aagtcatcag cggcaatgtt tcgccgagca agggaaagat ggatgaaacc 1020

gtcaacatta atgccggcaa caacatcgag attacccgca acggcaaaaa tatcgacatc 1080

gccacttcga tgaccccgca attttccagc gtttcgctcg gcgcgggggc ggatgcgccc 1140

actttaagcg tggatgacga gggcgcgttg aatgtcggca gcaaggatgc caacaaaccc 1200

gtccgcatta ccaatgtcgc cccgggcgtt aaagaggggg atgttacaaa cgtcgcgcaa 1260

cttaaaggtg tggcgcaaaa cttgaacaac cgcatcgaca atgtgaacgg caacgcgcgt 1320

gcgggcatcg cccaagcgat tgcaaccgca ggtctggttc aggcgtatct gcccggcaag 1380

agtatgatgg cgatcggcgg cggcacttat ctcggcgaag ccggttatgc catcggctac 1440

tcaagcattt ccgccggcgg aaattggatt atcaaaggca cggcttccgg caattcgcgc 1500

ggccatttcg gtgcttccgc atctgtcggt tatcagtggt aa 1542

<210> 30
<211> 1224
<212> DNA
<213> Neisseria meningitidis

<400> 30
atgaacaaaa tataccgcat catttggaat agtgccctca atgcatgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

actctgttgt ttgcaacggt tcaggcaagt gctaacaacg ttgatttcgt ccgcacttac 180

gacacagtcg agttcttgag cgcagatacg aaaacaacga ctgttaatgt ggaaagcaaa 240

gacaacggca agaaaaccga agttaaaatc ggtgcgaaga cttctgttat taaagaaaaa 300

gacggtaagt tggttactgg taaagacaaa ggcgagaatg gttcttctac agacgaaggc 360

gaaggcttag tgactgcaaa agaagtgatt gatgcagtaa acaaggctgg ttggagaatg 420

aaaacaacaa ccgctaatgg tcaaacaggt caagctgaca agtttgaaac cgttacatca 480

ggcacaaatg taacctttgc tagtggtaaa ggtacaactg cgactgtaag taaagatgat 540

caaggcaaca tcactgttat gtatgatgta aatgtcggcg atgccctaaa cgtcaatcag 600

ctgcaaaaca gcggttggaa tttggattcc aaagcggttg caggttcttc gggcaaagtc 660

atcagcggca atgtttcgcc gagcaaggga aagatggatg aaaccgtcaa cattaatgcc 720

ggcaacaaca tcgagattac ccgcaacggt aaaaatatcg acatcgccac ttcgatgacc 780

ccgcagtttt ccagcgtttc gctcggcgcg ggggcggatg cgcccacttt gagcgtggat 840

ggggacgcat tgaatgtcgg cagcaagaag gacaacaaac ccgtccgcat taccaatgtc 900

gccccgggcg ttaaagaggg ggatgttaca aacgtcgcac aacttaaagg cgtggcgcaa 960

aacttgaaca accgcatcga caatgtggac ggcaacgcgc gtgcgggcat cgcccaagcg 1020

attgcaaccg caggtctggt tcaggcgtat ttgcccggca agagtatgat ggcgatcggc 1080

ggcggcactt atcgcggcga agccggttac gccatcggct actccagtat ttccgacggc 1140

ggaaattgga ttatcaaagg cacggcttcc ggcaattcgc gcggccattt cggtgcttcc 1200

gcatctgtcg gttatcagtg gtaa 1224

<210> 31
<211> 1302
<212> DNA
<213> Neisseria meningitidis

<400> 31
atgaacaaaa tataccgcat catttggaat agtgccctca atgcatgggt cgtcgtatcc 60

gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg 120

actctgttgt ttgcaacggt tcaggcaagt gctaaccgtg cggcaagcgt taaagacgta 180

ttaaacgctg gctggaacat taaaggcgtt aaacccggta caacagcttc cgataacgtt 240

gatttcgtcc gcacttacga cacagtcgag ttcttgagcg cagatacgaa aacaacgact 300

gttaatgtgg aaagcaaaga caacggcaag aaaaccgaag ttaaaatcgg tgcgaagact 360

tctgttatta aagaaaaaga cggtaagttg gttactggta aagacaaagg cgagaatggt 420

tcttctacag acgaaggcga aggcttagtg actgcaaaag aagtgattga tgcagtaaac 480

aaggctggtt ggagaatgaa aacaacaacc gctaatggtc aaacaggtca agctgacaag 540

tttgaaaccg ttacatcagg cacaaatgta acctttgcta gtggtaaagg tacaactgcg 600

actgtaagta aagatgatca aggcaacatc actgttatgt atgatgtaaa tgtcggcgat 660

gccctaaacg tcaatcagct gcaaaacagc ggttggaatt tggattccaa agcggttgca 720

ggttcttcgg gcaaagtcat cagcggcaat gtttcgccga gcaagggaaa gatggatgaa 780

accgtcaaca ttaatgccgg caacaacatc gagattaccc gcaacggtaa aaatatcgac 840

atcgccactt cgatgacccc gcagttttcc agcgtttcgc tcggcgcggg ggcggatgcg 900

cccactttga gcgtggatgg ggacgcattg aatgtcggca gcaagaagga caacaaaccc 960

gtccgcatta ccaatgtcgc cccgggcgtt aaagaggggg atgttacaaa cgtcgcacaa 1020

cttaaaggcg tggcgcaaaa cttgaacaac cgcatcgaca atgtggacgg caacgcgcgt 1080

gcgggcatcg cccaagcgat tgcaaccgca ggtctggttc aggcgtattt gcccggcaag 1140

agtatgatgg cgatcggcgg cggcacttat cgcggcgaag ccggttacgc catcggctac 1200

tccagtattt ccgacggcgg aaattggatt atcaaaggca cggcttccgg caattcgcgc 1260

ggccatttcg gtgcttccgc atctgtcggt tatcagtggt aa 1302

<210> 32

<211> 1509
<212> DNA
<213> Neisseria meningitidis

<400> 32

```
atgaacaaaa tataccgcat catttggaat agtgccctca atgcatgggt cgtcgtatcc      60
gagctcacac gcaaccacac caaacgcgcc tccgcaaccg tgaagaccgc cgtattggcg     120
actctgttgt ttgcaacggt tcaggcaagt gctaacaccc tcaaagccgg cgacaacctg     180
aaaatcaaac aattcaccta ctcgctgaaa aaagacctca cagatctgac cagtgttgga     240
actgaaaaat tatcgtttag cgcaaacggc aataaagtca acatcacaag cgacaccaaa     300
ggcttgaatt ttgcgaaaga aacggctggg acgaacggcg acaccacggt tcatctgaac     360
ggtattggtt cgactttgac cgatcgtgcg gcaagcgtta aagacgtatt aaacgctggc     420
tggaacatta aaggcgttaa aaacgttgat ttcgtccgca cttacgacac agtcgagttc     480
ttgagcgcag atacgaaaac aacgactgtt aatgtggaaa gcaaagacaa cggcaagaaa     540
accgaagtta aaatcggtgc gaagacttct gttattaaag aaaaagacgg taagttggtt     600
actggtaaag acaaaggcga gaatggttct tctacagacg aaggcgaagg cttagtgact     660
gcaaaagaag tgattgatgc agtaaacaag gctggttgga gaatgaaaac aacaaccgct     720
aatggtcaaa caggtcaagc tgacaagttt gaaaccgtta catcaggcac aaatgtaacc     780
tttgctagtg gtaaaggtac aactgcgact gtaagtaaag atgatcaagg caacatcact     840
gttatgtatg atgtaaatgt cggcgatgcc ctaaacgtca atcagctgca aaacagcggt     900
tggaatttgg attccaaagc ggttgcaggt tcttcgggca aagtcatcag cggcaatgtt     960
tcgccgagca agggaaagat ggatgaaacc gtcaacatta atgccggcaa caacatcgag    1020
attacccgca acggtaaaaa tatcgacatc gccacttcga tgaccccgca gttttccagc    1080
gtttcgctcg gcgcgggggc ggatgcgccc actttgagcg tggatgggga cgcattgaat    1140
gtcggcagca agaaggacaa caaacccgtc cgcattacca atgtcgcccc gggcgttaaa    1200
gagggggatg ttacaaacgt cgcacaactt aaaggcgtgg cgcaaaactt gaacaaccgc    1260
atcgacaatg tggacggcaa cgcgcgtgcg ggcatcgccc aagcgattgc aaccgcaggt    1320
ctggttcagg cgtatttgcc cggcaagagt atgatggcga tcggcggcgg cacttatcgc    1380
ggcgaagccg gttacgccat cggctactcc agtatttccg acggcggaaa ttggattatc    1440
aaaggcacgg cttccggcaa ttcgcgcggc catttcggtg cttccgcatc tgtcggttat    1500
cagtggtaa                                                            1509
```

<210> 33
<211> 540
<212> PRT
<213> Neisseria meningitidis

<400> 33

```
Asn Asn Glu Glu Gln Glu Glu Tyr Leu Tyr Leu His Pro Val Gln Arg
1               5                  10                  15

Thr Val Ala Val Leu Ile Val Asn Ser Asp Lys Glu Gly Ala Gly Glu
            20                  25                  30

Lys Glu Lys Val Glu Glu Asn Ser Asp Trp Ala Val Tyr Phe Asn Glu
        35                  40                  45

Lys Gly Val Leu Thr Ala Arg Glu Ile Thr Leu Lys Ala Gly Asp Asn
    50                  55                  60

Leu Lys Ile Lys Gln Asn Gly Thr Asn Phe Thr Tyr Ser Leu Lys Lys
65                  70                  75                  80

Asp Leu Thr Asp Leu Thr Ser Val Gly Thr Glu Lys Leu Ser Phe Ser
                85                  90                  95

Ala His Gly Asn Lys Val Asn Ile Thr Ser Asp Thr Lys Gly Leu Asn
            100                 105                 110

Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr Val His Leu
        115                 120                 125

Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Leu Asn Thr Gly Ala
    130                 135                 140

Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu Lys Lys Arg
145                 150                 155                 160

Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys Gly
                165                 170                 175

Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe Val Arg Thr
            180                 185                 190

Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr Val
        195                 200                 205

Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val Lys Ile Gly
    210                 215                 220

Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr Gly
225                 230                 235                 240

Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu
                245                 250                 255

Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp Arg
```

```
            260                 265                 270

Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe
        275                 280                 285

Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser Gly Lys Gly
    290                 295                 300

Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val Met
305                 310                 315                 320

Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln Asn
                325                 330                 335

Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly Lys
            340                 345                 350

Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu Thr
        355                 360                 365

Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys
    370                 375                 380

Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser Val Ser
385                 390                 395                 400

Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Gly Asp Ala
                405                 410                 415

Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val Arg Ile Thr Asn
            420                 425                 430

Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala Gln Leu
        435                 440                 445

Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val Asp Gly
    450                 455                 460

Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu Val
465                 470                 475                 480

Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly Gly Thr
                485                 490                 495

Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser Asp
            500                 505                 510

Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg Gly
        515                 520                 525

His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
    530                 535                 540
```

<210> 34
<211> 541
<212> PRT
<213> Neisseria meningitidis

<400> 34

```
Thr Asp Glu Asp Glu Glu Glu Glu Leu Glu Ser Val Gln Arg Ser Val
1               5                  10                  15

Val Gly Ser Ile Gln Ala Ser Met Glu Gly Ser Val Glu Leu Glu Thr
            20                  25                  30

Ile Ser Leu Ser Met Thr Asn Asp Ser Lys Glu Phe Val Asp Pro Tyr
        35                  40                  45

Ile Val Val Thr Leu Lys Ala Gly Asp Asn Leu Lys Ile Lys Gln Asn
    50                  55                  60

Thr Asn Glu Asn Thr Asn Ala Ser Ser Phe Thr Tyr Ser Leu Lys Lys
65                  70                  75                  80

Asp Leu Thr Gly Leu Ile Asn Val Glu Thr Glu Lys Leu Ser Phe Gly
                85                  90                  95

Ala Asn Gly Lys Lys Val Asn Ile Ile Ser Asp Thr Lys Gly Leu Asn
            100                 105                 110

Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr Val His Leu
        115                 120                 125

Asn Gly Ile Gly Ser Thr Leu Thr Asp Met Leu Leu Asn Thr Gly Ala
    130                 135                 140

Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu Lys Lys Arg
145                 150                 155                 160

Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys Gly
                165                 170                 175

Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe Val Arg Thr
            180                 185                 190

Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr Val
        195                 200                 205

Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val Lys Ile Gly
    210                 215                 220

Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr Gly
225                 230                 235                 240

Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly Leu
                245                 250                 255

Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp Arg
            260                 265                 270

Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys Phe
        275                 280                 285
```

Glu Thr Val Thr Ser Gly Thr Lys Val Thr Phe Ala Ser Gly Asn Gly
290 295 300

Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val Lys
305 310 315 320

Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln Asn
325 330 335

Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly Lys
340 345 350

Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu Thr
355 360 365

Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly Lys
370 375 380

Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser Val Ser
385 390 395 400

Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Asp Glu Gly
405 410 415

Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro Val Arg Ile Thr
420 425 430

Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala Gln
435 440 445

Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val Asn
450 455 460

Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu
465 470 475 480

Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly Gly
485 490 495

Thr Tyr Leu Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser
500 505 510

Ala Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg
515 520 525

Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
530 535 540

<210> 35
<211> 461
<212> PRT
<213> Neisseria meningitidis

<400> 35

Asn Asn Glu Thr Asp Leu Thr Ser Val Gly Thr Glu Lys Leu Ser Phe
1 5 10 15

Ser Ala Asn Gly Asn Lys Val Asn Ile Thr Ser Asp Thr Lys Gly Leu
20 25 30

Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr Val His
35 40 45

Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Thr Leu Leu Asn Thr Gly
50 55 60

Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu Lys Lys
65 70 75 80

Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys
85 90 95

Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe Val Arg
100 105 110

Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr
115 120 125

Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val Lys Ile
130 135 140

Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr
145 150 155 160

Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly
165 170 175

Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp
180 185 190

Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys
195 200 205

Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser Gly Lys
210 215 220

Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val
225 230 235 240

Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln
245 250 255

Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly
260 265 270

Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu
275 280 285

Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly
290 295 300

Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser Val
305 310 315 320

Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Gly Asp
325 330 335

Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val Arg Ile Thr
340 345 350

Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala Gln
355 360 365

Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val Asp
370 375 380

Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly Leu
385 390 395 400

Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly Gly
405 410 415

Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile Ser
420 425 430

Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn Ser Arg
435 440 445

Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
450 455 460

<210> 36
<211> 462
<212> PRT
<213> Neisseria meningitidis

<400> 36

Thr Asp Glu Thr Gly Leu Ile Asn Val Glu Thr Glu Lys Leu Ser Phe
1 5 10 15

Gly Ala Asn Gly Lys Lys Val Asn Ile Ile Ser Asp Thr Lys Gly Leu
20 25 30

Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly Asp Thr Thr Val His
35 40 45

Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Met Leu Leu Asn Thr Gly
50 55 60

Ala Thr Thr Asn Val Thr Asn Asp Asn Val Thr Asp Asp Glu Lys Lys
65 70 75 80

Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys
85 90 95

Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe Val Arg
100 105 110

Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr Thr

115 120 125

Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val Lys Ile
130 135 140

Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val Thr
145 150 155 160

Gly Lys Gly Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu Gly
165 170 175

Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly Trp
180 185 190

Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp Lys
195 200 205

Phe Glu Thr Val Thr Ser Gly Thr Lys Val Thr Phe Ala Ser Gly Asn
210 215 220

Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr Val
225 230 235 240

Lys Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu Gln
245 250 255

Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser Gly
260 265 270

Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp Glu
275 280 285

Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn Gly
290 295 300

Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser Val
305 310 315 320

Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Asp Glu
325 330 335

Gly Ala Leu Asn Val Gly Ser Lys Asp Ala Asn Lys Pro Val Arg Ile
340 345 350

Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala
355 360 365

Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val
370 375 380

Asn Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly
385 390 395 400

Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly
405 410 415

Gly Thr Tyr Leu Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile

420 425 430

Ser Ala Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn Ser
435 440 445

Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
450 455 460

<210> 37
<211> 356
<212> PRT
<213> Neisseria meningitidis

<400> 37

Asn Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser
1 5 10 15

Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn Gly
20 25 30

Lys Lys Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys Glu
35 40 45

Lys Asp Gly Lys Leu Val Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser
50 55 60

Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile Asp
65 70 75 80

Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn Gly
85 90 95

Gln Thr Gly Gln Ala Asp Lys Phe Glu Thr Val Thr Ser Gly Thr Asn
100 105 110

Val Thr Phe Ala Ser Gly Lys Gly Thr Thr Ala Thr Val Ser Lys Asp
115 120 125

Asp Gln Gly Asn Ile Thr Val Met Tyr Asp Val Asn Val Gly Asp Ala
130 135 140

Leu Asn Val Asn Gln Leu Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys
145 150 155 160

Ala Val Ala Gly Ser Ser Gly Lys Val Ile Ser Gly Asn Val Ser Pro
165 170 175

Ser Lys Gly Lys Met Asp Glu Thr Val Asn Ile Asn Ala Gly Asn Asn
180 185 190

Ile Glu Ile Thr Arg Asn Gly Lys Asn Ile Asp Ile Ala Thr Ser Met
195 200 205

Thr Pro Gln Phe Ser Ser Val Ser Leu Gly Ala Gly Ala Asp Ala Pro
210 215 220

```
Thr Leu Ser Val Asp Gly Asp Ala Leu Asn Val Gly Ser Lys Lys Asp
225                 230                 235                 240

Asn Lys Pro Val Arg Ile Thr Asn Val Ala Pro Gly Val Lys Glu Gly
                245                 250                 255

Asp Val Thr Asn Val Ala Gln Leu Lys Gly Val Ala Gln Asn Leu Asn
            260                 265                 270

Asn Arg Ile Asp Asn Val Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln
        275                 280                 285

Ala Ile Ala Thr Ala Gly Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser
    290                 295                 300

Met Met Ala Ile Gly Gly Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala
305                 310                 315                 320

Ile Gly Tyr Ser Ser Ile Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly
                325                 330                 335

Thr Ala Ser Gly Asn Ser Arg Gly His Phe Gly Ala Ser Ala Ser Val
            340                 345                 350

Gly Tyr Gln Trp
        355

<210>  38
<211>  382
<212>  PRT
<213>  Neisseria meningitidis

<400>  38

Asn Arg Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile
1               5                   10                  15

Lys Gly Val Lys Pro Gly Thr Thr Ala Ser Asp Asn Val Asp Phe Val
            20                  25                  30

Arg Thr Tyr Asp Thr Val Glu Phe Leu Ser Ala Asp Thr Lys Thr Thr
        35                  40                  45

Thr Val Asn Val Glu Ser Lys Asp Asn Gly Lys Lys Thr Glu Val Lys
    50                  55                  60

Ile Gly Ala Lys Thr Ser Val Ile Lys Glu Lys Asp Gly Lys Leu Val
65                  70                  75                  80

Thr Gly Lys Asp Lys Gly Glu Asn Gly Ser Ser Thr Asp Glu Gly Glu
                85                  90                  95

Gly Leu Val Thr Ala Lys Glu Val Ile Asp Ala Val Asn Lys Ala Gly
            100                 105                 110

Trp Arg Met Lys Thr Thr Thr Ala Asn Gly Gln Thr Gly Gln Ala Asp
        115                 120                 125
```

Lys Phe Glu Thr Val Thr Ser Gly Thr Asn Val Thr Phe Ala Ser Gly
130 135 140

Lys Gly Thr Thr Ala Thr Val Ser Lys Asp Asp Gln Gly Asn Ile Thr
145 150 155 160

Val Met Tyr Asp Val Asn Val Gly Asp Ala Leu Asn Val Asn Gln Leu
165 170 175

Gln Asn Ser Gly Trp Asn Leu Asp Ser Lys Ala Val Ala Gly Ser Ser
180 185 190

Gly Lys Val Ile Ser Gly Asn Val Ser Pro Ser Lys Gly Lys Met Asp
195 200 205

Glu Thr Val Asn Ile Asn Ala Gly Asn Asn Ile Glu Ile Thr Arg Asn
210 215 220

Gly Lys Asn Ile Asp Ile Ala Thr Ser Met Thr Pro Gln Phe Ser Ser
225 230 235 240

Val Ser Leu Gly Ala Gly Ala Asp Ala Pro Thr Leu Ser Val Asp Gly
245 250 255

Asp Ala Leu Asn Val Gly Ser Lys Lys Asp Asn Lys Pro Val Arg Ile
260 265 270

Thr Asn Val Ala Pro Gly Val Lys Glu Gly Asp Val Thr Asn Val Ala
275 280 285

Gln Leu Lys Gly Val Ala Gln Asn Leu Asn Asn Arg Ile Asp Asn Val
290 295 300

Asp Gly Asn Ala Arg Ala Gly Ile Ala Gln Ala Ile Ala Thr Ala Gly
305 310 315 320

Leu Val Gln Ala Tyr Leu Pro Gly Lys Ser Met Met Ala Ile Gly Gly
325 330 335

Gly Thr Tyr Arg Gly Glu Ala Gly Tyr Ala Ile Gly Tyr Ser Ser Ile
340 345 350

Ser Asp Gly Gly Asn Trp Ile Ile Lys Gly Thr Ala Ser Gly Asn Ser
355 360 365

Arg Gly His Phe Gly Ala Ser Ala Ser Val Gly Tyr Gln Trp
370 375 380

<210> 39
<211> 201
<212> PRT
<213> Neisseria meningitidis

<400> 39

Ser Ala Asn Thr Leu Lys Ala Gly Asp Asn Leu Lys Ile Lys Gln Phe

1 5 10 15

Thr Tyr Ser Leu Lys Lys Asp Leu Thr Asp Leu Thr Ser Val Gly Thr
20 25 30

Glu Lys Leu Ser Phe Ser Ala Asn Gly Asn Lys Val Asn Ile Thr Ser
35 40 45

Asp Thr Lys Gly Leu Asn Phe Ala Lys Glu Thr Ala Gly Thr Asn Gly
50 55 60

Asp Thr Thr Val His Leu Asn Gly Ile Gly Ser Thr Leu Thr Asp Arg
65 70 75 80

Ala Ala Ser Val Lys Asp Val Leu Asn Ala Gly Trp Asn Ile Lys Gly
85 90 95

Val Lys Asn Val Asp Phe Val Arg Thr Tyr Asp Thr Val Glu Phe Leu
100 105 110

Ser Ala Asp Thr Lys Thr Thr Thr Val Asn Val Glu Ser Lys Asp Asn
115 120 125

Gly Lys Lys Thr Glu Val Lys Ile Gly Ala Lys Thr Ser Val Ile Lys
130 135 140

Glu Lys Asp Gly Lys Leu Val Thr Gly Lys Asp Lys Gly Glu Asn Gly
145 150 155 160

Ser Ser Thr Asp Glu Gly Glu Gly Leu Val Thr Ala Lys Glu Val Ile
165 170 175

Asp Ala Val Asn Lys Ala Gly Trp Arg Met Lys Thr Thr Thr Ala Asn
180 185 190

Gly Gln Thr Gly Gln Ala Asp Lys Phe
195 200

<210> 40
<211> 51
<212> DNA
<213> Neisseria meningitidis

<400> 40
caattaacgg ccgaataaaa ggaagccgat atgaacaaaa tataccgcat c 51

<210> 41
<211> 31
<212> DNA
<213> Neisseria meningitidis

<400> 41
tggaatccat ggaatcgcca cccttccctt c 31

<210> 42

<211> 30
<212> DNA
<213> Neisseria meningitidis

<400> 42
ggtcagatct gtttcattgt tagcacttgc 30

<210> 43
<211> 30
<212> DNA
<213> Neisseria meningitidis

<400> 43
gatcaggcct gtatcttcat cggtagcatt 30

<210> 44
<211> 39
<212> DNA
<213> Neisseria meningitidis

<400> 44
gacgaaatca acgttcttag cacttgcctg aaccgttgc 39

<210> 45
<211> 24
<212> DNA
<213> Neisseria meningitidis

<400> 45
aacgttgatt tcgtccgcac ttac 24

<210> 46
<211> 39
<212> DNA
<213> Neisseria meningitidis

<400> 46
aacgcttgcc gcacgcttag cacttgcctg caacgttgc 39

<210> 47
<211> 24
<212> DNA
<213> Neisseria meningitidis

<400> 47
cgtgcggcaa gcgttaaaga cgta 24

<210> 48
<211> 72
<212> DNA
<213> Neisseria meningitidis

<400> 48
cagcgagtag gtgaattgtt tgattttcag gttgtcgccg gctttgaggg tgttagcact 60

tgcctgaacc gt 72

<210> 49
<211> 24
<212> DNA
<213> Neisseria meningitidis

<400> 49
ttcacctact cgctgaaaaa agac 24

<210> 50
<211> 57
<212> DNA
<213> Neisseria meningitidis

<400> 50
gccagcgttt aatacgtctt taacgcttgc cgcacgatcg gtcaaagtcg aaccaat 57

A2 Concluded

<210> 51
<211> 57
<212> DNA
<213> Neisseria meningitidis

<400> 51
gtattaaacg ctggctggaa cattaaaggc gttaaaaacg ttgatttcgt ccgcact 57

<210> 52
<211> 11
<212> PRT
<213> Neisseria meningitidis

<220>
<221> misc_feature
<223> "X" is any amino acid or absent amino acid

<400> 52

Xaa Xaa Glu Thr Asp Leu Thr Ser Val Gly Thr
1 5 10